

9/28/17

"Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time." -Thomas Edison

HW: "2017 A2 CC1 L7 Simplifying Radicals" homework section #2-20 even
Test 2 on Monday 10/16

AIM: How do we simplify radicals?

Warm Up:

Fill in the missing values

Perfect Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144...

$x^2, x^4, x^6, \underline{x^8}, \underline{x^{10}} \dots$ Exponents must be Even.

$\sqrt{25}$ is read "radical 25" "the square root of 25".

$$\sqrt{25} = 5 \text{ because } 5^2 = 25$$

$$\sqrt{36} = 6 \text{ because } \underline{6^2} = \underline{36}$$

$$\sqrt{100} = \underline{10} \qquad \sqrt{49} = \underline{7}$$

$$\sqrt{a^6} = a^3 \text{ because } \overset{\binom{3}{a}}{(a^3)^2} = a^6$$

$$\sqrt{m^{16}} = m^8 \text{ because } \underline{(m^8)^2} = \underline{m^{16}}$$

$$\sqrt{y^{10}} = \underline{y^5} \qquad \sqrt{a^2} = \underline{a' \text{ or } a}$$

Hint: Divide the exponent by 2.

In the expression \sqrt{a} , the $\sqrt{\quad}$ is called the radical and a is called the radicand.

Simplify (Simplifying Perfect Squares):

1. $\sqrt{4} = 2$

2. $\sqrt{16} = 4$

3. $-\sqrt{100} = -10$

4. $\sqrt{a^8} = a^4$

5. $\sqrt{w^{12}} = w^6$

6. $\sqrt{a^6 b^{10}}$
 $= a^3 b^5$

7. $\sqrt{9a^2}$
 $= 3a$

8. $-\sqrt{81m^{64}}$
 $= -9m^{32}$

9. $\sqrt{49a^4 b^{12}}$
 $= 7a^2 b^6$

10. $\sqrt{121x^{14} y^6}$
 $= 11x^7 y^3$

Simplify (Simplifying Radicals that are not Perfect Squares):

1. $\sqrt{20} = \sqrt{4} \cdot \sqrt{5} = 2\sqrt{5}$

2. $\sqrt{27} = \sqrt{9}\sqrt{3} = 3\sqrt{3}$

3. $\sqrt{48} = \sqrt{16}\sqrt{3} = 4\sqrt{3}$

4. $\sqrt{45} = \sqrt{\overset{\text{Perfect}}{9}}\sqrt{\overset{\text{Nonperfect}}{5}} = \underline{3\sqrt{5}}$

5. $\sqrt{12} = \sqrt{4}\sqrt{3} = \underline{2\sqrt{3}}$

6. $\sqrt{50} =$

$$\begin{array}{c} \swarrow \quad \searrow \\ \sqrt{25} \quad \sqrt{2} \\ \hline \textcircled{5\sqrt{2}} \end{array}$$

7. $\sqrt{a^5} = \sqrt{a^4}\sqrt{a} = a^2\sqrt{a}$

$$8. \sqrt{x^9} = \sqrt{x^8}\sqrt{x^1} = \underline{x^4\sqrt{x}}$$

$$\begin{array}{cc} \downarrow & \downarrow \\ x^4 & \sqrt{x} \end{array}$$

9. $\sqrt{x^3} =$

$$\begin{array}{c} \swarrow \quad \searrow \\ \sqrt{x^2} \quad \sqrt{x} \\ \hline \textcircled{x\sqrt{x}} \end{array}$$

Simplify:

1. $\sqrt{18}$

$$\sqrt{9} \sqrt{2}$$

$$3\sqrt{2}$$

2. $\sqrt{125}$

$$\sqrt{25} \sqrt{5}$$

$$5\sqrt{5}$$

3. $\sqrt{72}$

⊗ look for largest perfect square factor

$$\sqrt{36} \sqrt{2}$$

$$6\sqrt{2}$$

4. $\sqrt{180}$

$$\sqrt{36} \sqrt{5}$$

$$6\sqrt{5}$$

5. $\sqrt{a^3}$

$$\sqrt{a^2} \sqrt{a}$$

$$a\sqrt{a}$$

3. $2\sqrt{2}$

$$6\sqrt{2}$$

6. $\sqrt{b^7}$

7. $\sqrt{m^{11}}$

8. $\sqrt{75x^7y^5}$

$$\sqrt{25x^6y^4} \sqrt{3xy}$$

$$5x^3y^2\sqrt{3xy}$$

9. $\sqrt{27a^{11}b^7}$

10. $\sqrt{32a^7b^4}$

$$\sqrt{16a^6b^4} \sqrt{2a}$$

$$4a^3b^2\sqrt{2a}$$

11. $\sqrt{9a^8}$

12. $\sqrt{45a^7}$

13. $\sqrt{36x^2y^6}$

14. $\sqrt{12x^{20}y^8}$

15. $-\sqrt{200}$

16. $\sqrt{196}$

17. $\sqrt{63x^4y}$

18. $\sqrt{6x^3}$

19. $\sqrt{100x^5y}$

20. $\sqrt{80x^{100}y^{49}}$

$$\sqrt{16x^{100}y^{48}} \sqrt{5y}$$

$$4x^{50}y^{24}\sqrt{5y}$$

Even exponents are perfect squares